AGENDA ITEM III D

PROPOSED ACADEMIC PROGRAM

LOUISIANA TECH UNIVERSITY

B.S. IN GEOGRAPHIC INFORMATION SCIENCE

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STAFF ANALYSIS

1.   **Objectives/Curriculum**

Objectives:

> *A degree program in geographic information science (GISc) is primarily concerned with educating students for a variety of career fields that require a command of geographic information systems (GIS) software. GIS allows users to effectively and efficiently store, manage, display and analyze vast data sets. GIS can be used in virtually all instances where data can be linked to a place and is used by numerous public and private interests to manage and analyze data.*
>
> *On the most basic level, the program will instruct students in the proper use of popular GIS software applications, such as ArcGIS, ArcView, MapInfo, and ERDAS. The program will also include instruction regarding theoretical approaches to GIS, so that graduates will be able to function in workplace environments characterized by ever-changing software and hardware.*

The curriculum totals 125 hours, divided into general education coursework (48 hrs., exceeding BOR requirements), major core coursework in GISc (38 hours), and major coursework in one of two degree options (39 hours), which the University describes below:

> *Students majoring in GISc will be able to choose from two separate preparation tracks: Social Science or Natural Resources. The Social Science concentration will prepare graduates for career fields that engage more specifically social, economic, transportation and/or political issues. The Natural Resources concentration will prepare graduates for career fields that more specifically engage environmental issues and issues that pertain to the natural sciences.*

Major coursework is multi-disciplinary. In-state reviewers and staff observe that many proposed courses are entirely new. A list of new courses appears below:

- GIS Spatial Statistics
- Problems in GIS, Spatial Data, and Remote Sensing
- Computer Programming for GIS I
- Computer Programming for GIS II
- GIS Spatial Database Applications I
- GIS Spatial Database Applications II
- GIS Application Project
- Environmental Geography
- Biogeography
- Geomorphology
- Special Topics in Geography

2. Need

The proposal notes the following:

> *Earlier this year, the U.S. Department of Labor (USDOL) identified geotechnology, a field that incorporates the use of GIS technology, as one of the three most important emerging and evolving fields. According to the USDOL, the present US$5-billion worldwide GIS market is expected to grow to $30 billion by 2005 -- a rise partially explained by the increased adoption of GIS technology by government agencies...*

> *According to one industry estimate, since 1999 the demand for GIS technicians in the private sector has doubled relative to the demand for other staffing needs among all employers. A spokesman for Digital Globe of Longmont, CO, a corporate provider of GIS imagery, claims that the company has identified 54 markets within which GIS technologies are starting to play a role.*

There are currently no degree programs of this type in the state, but well-developed undergraduate and graduate curricular concentrations, along with faculty specialized in this area, certainly do exist at LSU, UNO, and to some extent at ULL. The Board of Regents approved the creation of a Center for GeoInformatics at LSU in June 2001. In March 2003, the Board of Regents also approved the creation of a program related to the one proposed here: a B.S. in Geomatics was approved for implementation at Nicholls State University. The proposed program differs chiefly in terms of breadth: geomatics has a sharp focus on surveying and land-use issues and as such can be viewed as a sub-set of geoinformatics.

The University perceives the need to distinguish GISc training as a separate degree program for two reasons:

> *Because many advertisements for career opportunities for graduates with GISc training specifically mention a degree in GISc as a favored condition of employment, it seems logical that students holding a bachelors degree in GISc would have a competitive advantage over those students who have training in GISc but do not hold a degree in the field.*

The establishment of a GISc degree at Louisiana Tech University is a necessary and cost-effective strategy for aiding comprehensive, statewide efforts to promote the type of technology-based economic development laid out in Louisiana's economic master plan currently being supported and pursued by Governor Blanco.

3.   Students

The University bases the following enrollment and completion projections on the numbers of students currently pursuing a minor in GISc and who have expressed interest in furthering their studies; the University also expects that "a large number of students will be attracted to the program that otherwise might not have enrolled at Louisiana Tech."

	Year 1	Year 2	Year 3	Year 4	Year 5
Freshmen	10	15	20	25	25
Sophomores	-	10	15	20	25
Juniors	-	-	10	15	20
Seniors	-	-	-	10	15
Graduates	10	25	45	70	85

The University evidently anticipates no student attrition, thought students need only to be admitted to the University and possess basic computer skills to enter the program.

4.   Faculty

Five full-time faculty are to be associated with this program directly; most are recent hires to the University; two are fairly well-advanced in their careers. Three faculty reside in the Department of Forestry, one in the Social Sciences (Geography), and one in Biological Sciences/ Environmental Science. The faculty member in Geography is the only full-time faculty member teaching geography courses at the University and currently experiences a student-faculty ratio of 219:1. One untenured faculty member in Forestry is not teaching currently but reported to be engaged with other projects; this person would be expected to begin teaching the GIS introductory survey in Spring 2005.

Given the number of new courses in the curriculum, the projected number of students, and the teaching loads of current faculty, the staff and in-state reviewers were more than mildly concerned about the University's faculty capacity to offer the program. The University acknowledges it needs additional faculty to initiate the program:

It is estimated that one new full-time faculty will be needed to initiate the program, unless enrollment significantly exceeds expected projections. With the included curriculum in mind, there will be opportunities for some redirection of existing faculty expertise and consideration of meeting specific needs of this program when replacing faculty due to

retirement or resignation.

Salary for the new position will be competitive enough to attract a top-quality person who has significant coursework and training in GISc.

5.   Library

The University library has access to state, regional, and national library networks. Holdings are claimed to be sufficient to initiate the program. Although the University observes that "much of the library resources required of a new GISc program overlap with that required of other cognate fields," it does state that "additional library holdings will be necessary to remain current in a rapidly changing technical field." Chief among new acquisitions will be "a number of recent reference books" which will total "about $1,000 per year, which the university is committed to provide from library allocations."

Total library expenditures for Forestry, Geosciences, and Social Sciences are reported as $37,368.09 in 2003 and $46,810.05 in 2004.

6.   Facilities/Equipment

There are two main facilities associated with the program. Equipment directly relevant to GISc is listed below.

> **The Spatial Data Laboratory** (SDL) in the School of Forestry. *The SDL was created in 1999 as a state-of-the-art high-tech facility used for teaching and research purposes. Currently, the SDL has 32 PCs (16 Dell OptiPlex GX computers, etc.,) and runs ArcGIS, ArcInfor, and ERDAS Imagine as well as software for GPS. GPS equipment includes one GPS map station, three GeoExplorer 1's, one GeoExplorer 2, four GeoExplorer 3's, one Trimble ProXL, one Trimble ProXR, two NEI GeoXM's, and one NEI GeoXT.*

> **The Computer Cartography Laboratory and Social Sciences Computing Lab** in the Department of Social Sciences. *This lab was equipped in 2001 with 25 computer workstations loaded with GIS (MapInfo and ArcView) and statistical software packages, along with the standard complement of word processing and database management software. ... This lab is primarily used for instruction but is also used for specialized research needs of the Social Science faculty. Two courses specific to the curriculum of the GIS minor have been regularly taught in this laboratory... At the present time, 16 workstations in the laboratory can be effectively used to teach GIS or spatial analysis.*

The University states that it will need to replace computer equipment every two to three years and that "the estimated funds needed for full replacement would be $150,000. The University will seek funding from grants and technology funds to replace equipment during 2006-07 and 2007-08. If external funds are not available, the university will allocate funds to replace the equipment."

7.   Administration

Because the program is interdisciplinary and interdepartmental, the proposal explains:

> *The deans of the College of Applied and Natural Sciences and the College of Liberal Arts will share administrative responsibilities for the program. Appropriate authority and responsibility will be delegated to the Director of the School of Forestry and the Head of the Department of Social Sciences. Functional management will reside with the supervisors of the SDL Lab. A Steering Committee will oversee the program, meeting regularly... Recommended actions regarding the program and its support will reviewed and decided by the two deans, who report to the Vice President for Academic Affairs.*

8.   Accreditation

From the proposal:

> *There is currently no accrediting body for GIS; however, approval of the program will assist and strengthen continued accreditation of the School of Forestry.*

9.   Budget

The University states that "no additional appropriation is requested."

The program will be supported through the budgets for the School of Forestry and the Department of Social Sciences. Current resources are reported to be adequate for implementation in Fall 2005, but three areas of support will quickly require attention:

a)   **Faculty.** "One new faculty member will be needed within the second year." The University has expressed the commitment to hire a full-time person for the Department of Geography with "significant coursework and training in GISc." This person will be expected to teach new GISc coursework.

b)   **Library/Equipment.** "An additional $12,000 is needed" to expand the software licensing agreement for ESRI Arch Info and ERDAS Imagine. The University states that it "will budget funds for this annual increase in licensing costs" as part of its general operating costs. Operating costs will also expand to include a projected $150,000 every two to three years to replace computing equipment. The library budget will be increased only slightly to acquire new holdings.

c)   **Operating costs.** "Annual operating budgets for the School of Forestry and the Department of Social Sciences will be increased by $3,000 per unit. These funds will be used for marketing the GISc degree via brochures and other recruiting methods as well as postage, supplies, and copying costs. Additional funds will be used for travel to fulfill annual training requirements for one faculty member."

The University has stated to the staff, subsequent to the proposal, that the additional resources needed to support the program will come from internal budgetary adjustments. No additional state appropriation is requested.

STAFF SUMMARY

The objectives and design of the proposed curriculum are consistent with emerging norms for curricula of this type. Need for the program is established by national labor forecasts and by the absence of a degree program in GISc, particularly in the northern part of the state. Projected enrollment is modest, but the numbers are probably realistic given the limited number of faculty available. Greater attention should be given to admission requirements and prerequisites for major courses, as well as to student attrition.

Current faculty resources are limited; the hiring of an additional full-time faculty member in Geography with expertise in GISc is critical to the viability of the program. Library resources are probably adequate to initiate the program. Facilities appear to be adequate as well; the equipment listed in the proposal is similar to what one finds at other programs around the country. Administrative plans are reasonable given the degree's multi-disciplinary nature. Programmatic accreditation is not an issue. The University believes that the program will not require additional state appropriations, but will derive its major means of support from internal budgetary adjustments.

The staff remains concerned, however, that resources from the program are not entirely in place. Critical faculty remain to be hired; the precise budgetary adjustments remain sketchy. For this reason, the staff recommends conditional approval, with a stipulation that no implementation date be set until after the additional faculty member is hired. Thereafter, an implementation report to the Commissioner of Higher Education, addressing other concerns cited in the staff summary, will be required.

STAFF RECOMMENDATION

The staff recommends that the Academic and Student Affairs Committee grant conditional approval for the proposed Bachelor of Science in Geographic Information Science program (CIP Code 45.0799) at Louisiana Tech University, subject to the following stipulations:

1. *The Board of Regents shall consider a date for program implementation once an additional full-time faculty member has been hired to teach major coursework.*

2. *Once the program is implemented, the Board of Regents may require a progress report.*